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(72) Inventor: **Klinghult, Gunner**  
**221 83 Lund (SE)**

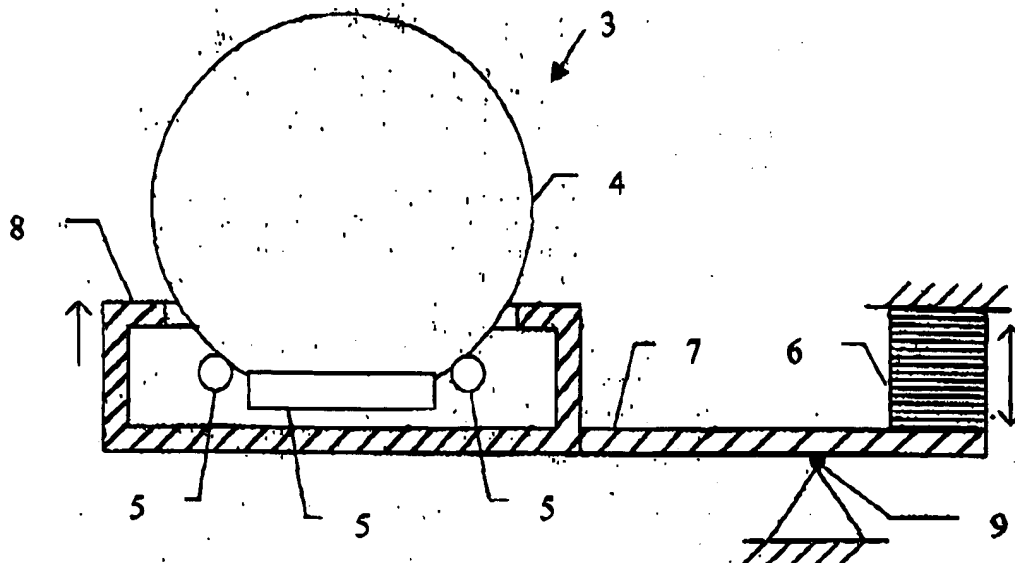
(74) Representative: **Akerman, Marten Lennart et al**  
**Albina Malmö AB**  
**Box 4289**  
**203 14 Malmö (SE)**

(71) Applicant: **Sony Ericsson Mobile**  
**Communications AB**  
**221 88 Lund (SE)**

(54) **Tactile feedback method and device**

(57) The invention relates to a tactile feedback method and device, and more particularly a method and mechanism for providing a user with a physical touch sensation when moving a cursor through a menu on a display, typically in a portable device such as a mobile telephone. The invention also relates such a portable device incorporating a tactile feedback device. Thus, the invention provides a method in a device for providing a tactile sensation in connection with a pointing device (3, 4), the pointing device being used for inputting signals

to a control device guiding a cursor on a display. A tactile sensation is generated when the cursor is moved to a defined position on the display. The tactile sensation device comprises an actuator (8) adapted to be controlled by the control device and connected to a link mechanism (7) capable of impacting the pointing device (3, 4). The link mechanism may be adapted to hit the pointing device resulting in a click feel and/or to hit the pointing device repeatedly resulting in a vibration feel when defined events occur in the display.

**FIG 2**

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**Description****Field of the invention**

[0001] The present invention relates to a tactile feedback method and device, and more particularly a method and mechanism for providing a user with a physical touch sensation when moving a cursor through a menu on a display, typically in a portable device such as a mobile telephone. The invention also relates to such a portable device incorporating a tactile feedback device.

**State of the art**

[0002] US 6,271,894 discloses a graphic user interface pointing device for use in a keyboard for a computer system including a joystick actuator, which is attached between pre-selected keys of a keyboard unit. The actuator comprises a ferromagnetic slug that is driven to make a tactile feedback that may be sensed by the user of the control input device.

[0003] In the known device the tactile feedback is connected with the movement of the joystick itself, and not with events encountered on a display. Also problems would be encountered if this known device should be incorporated in portable device with a limited space and in combination with a pointing mechanism having a ball and magnetic rolls.

[0004] The present invention solves among other things the above-mentioned problems by providing a tactile sensation method and device. The device is adapted to be connected to a control device guiding a cursor on a display, such that the tactile sensation device will respond to the control device when defined events occur on the display. Also the tactile sensation device is adapted to impart click and/or vibration feels by impacting a pointing device.

**Summary of the invention**

[0005] According to a first aspect, the invention provides a method of providing tactile feedback in a portable device comprising a display for showing images including a movable cursor, and a pointing device, the pointing device being used for inputting signals to a control device guiding the cursor on the display (2). In the method, a tactile sensation is generated when the cursor is moved to a defined position on the display.

[0006] Preferably a click feel is generated.

[0007] Different click feels may be generated when the cursor is moved to different defined positions on the display, including single clicks, dual clicks, and clicks with different amplitudes.

[0008] Also a vibration feel may be generated when the cursor is moved over a defined area on the display.

[0009] Different vibration feels may be generated when the cursor is moved over different defined areas on the display including slow and quick vibrations.

[0010] Suitably, a click sound is generated simultaneously with the click feel, and a buzzing sound is generated simultaneously with the vibration feel.

[0011] According to a second aspect, the invention provides a device for providing a tactile sensation in connection with a pointing device, the pointing device being used for inputting signals to a control device guiding a cursor on a display. The tactile sensation device comprises an actuator adapted to be controlled by the control device and connected to a link mechanism capable of impacting the pointing device.

[0012] Preferably, the link mechanism is spaced from the pointing device when not impacting it.

[0013] The link mechanism may be adapted to hit the pointing device resulting in a click feel and/or to hit the pointing device repeatedly resulting in a vibration feel.

[0014] Preferably, the link mechanism is capable of hitting the pointing device in different ways, resulting in different click feels including single clicks, dual clicks, and clicks with different amplitudes.

[0015] Also the link mechanism may be capable of creating a vibration in the pointing device in different ways, resulting in different vibration feels including slow and quick vibrations.

[0016] In one embodiment the link mechanism comprises a lever, one end of which is movable by the actuator and the other end of which is adapted to impact the pointing device.

[0017] The link mechanism may be provided with a substantially circular contact surface for contacting a ball of the pointing device.

[0018] Preferably, the circular contact surface is adapted to be located above magnetic rolls of the pointing device.

[0019] The link mechanism may be made of steel.

[0020] Suitably, the actuator comprises a linear motor, a piezoelectric device or a solenoid.

[0021] According to a third aspect, the invention provides a portable device comprising a display for showing images including a movable cursor, and a pointing device, the pointing device being used for inputting signals to a control device guiding the cursor on the display. The portable device comprises a device for providing a tactile sensation in connection with the pointing device, wherein the tactile sensation device comprises an actuator adapted to be controlled by the control device and connected to a link mechanism capable of impacting the pointing device.

[0022] Preferably, the link mechanism is spaced from the pointing device when not impacting it.

[0023] The link mechanism may be adapted to hit the pointing device resulting in a click feel.

[0024] Preferably, the link mechanism is capable of hitting the pointing device in different ways, resulting in different click feels including single clicks, dual clicks, and clicks with different amplitudes.

[0025] The portable device may further comprise a sound generator adapted to generate a click sound el-

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multaneous with the click feel).

[0026] Preferably, the control device is adapted to command a click feel, and possibly a click sound, when the cursor is moved to a defined position on the display.

[0027] The link mechanism may be adapted to hit the pointing device repeatedly resulting in a vibration feel.

[0028] Also the link mechanism may be capable of creating a vibration in the pointing device in different ways, resulting in different vibration feels including slow and quick vibrations.

[0029] The sound generator may further be adapted to generate a buzzing sound simultaneous with the vibration feel.

[0030] Preferably, the control device is adapted to command a vibration feel, and possibly a buzzing sound, when the cursor is moved over a defined area on the display.

[0031] In one embodiment the link mechanism comprises a lever, one end of which is movable by the actuator and the other end of which is adapted to impact the pointing device.

[0032] The link mechanism may be provided with a substantially circular contact surface for contacting a ball of the pointing device.

[0033] Preferably, the circular contact surface is adapted to be located above magnetic rolls of the pointing device.

[0034] The link mechanism may be made of steel.

[0035] Suitably, the actuator comprises a linear motor, a piezoelectric device or a solenoid.

[0036] The portable device may be a mobile radio terminal, e.g. a mobile telephone, a pager, a communicator, an electric organiser or a smartphone.

#### Brief description of the drawings

[0037] The invention will be described in detail below with reference to the accompanying drawings, in which:

fig. 1 is general view of a mobile telephone incorporating an embodiment of the invention,

fig. 2 is a side view, partially in cross section, of a tactile sensation device in connection with a track ball, and

fig. 3 is a top view of an embodiment of the link mechanism according to the invention.

#### Detailed description of preferred embodiments

[0038] As mentioned in the Introduction, the invention relates to a tactile sensation method and device in connection with a pointing device, especially in portable equipment such as mobile telephones.

[0039] A typical mobile telephone is shown in fig. 1. The mobile telephone 1 is provided with a display 2 and pointing device 3 comprising a ball member, a so-called "track ball", used for navigating back and forth in menus shown on the display 2. The ball is turned by one finger.

The pointing device supplies electric signals to a control device in the mobile telephone controlling events on the display, particularly movement of a cursor up and down, and left and right.

[0040] A problem with this type of input device like the track ball is the lack of tactile feedback for the user. The user gets no feedback to this finger from what his eyes can see when moving the cursor. This can make it difficult for the user to position the cursor while scrolling in the menu.

[0041] The idea according to one embodiment of the invention is to use an electrical driven actuator to create a mechanical impulse or vibration on the ball. This will give the finger of the user a feeling of a tactile feedback. The impulse should give the user a feeling of a click as the cursor is positioned on the screen.

[0042] Fig. 2 shows a tactile sensation device in accordance with one embodiment of the invention in connection with a track ball mechanism. The ball 4 is lying on four rolls 5 made of a magnetic material. The rolls 5 are arranged at right angles to each other. Only three of the rolls 5 are visible in figure 2. As the ball 4 is moved the rolls 5 will also be turned. The movement of the rolls 5 is in turn sensed by a number of Hall element sensors, each placed in the vicinity of each roll e.g. on a circuit board located underneath the ball 4 (not shown). The Hall element sensors will give electric signals as output. For clarity not all the details of the suspension of the ball 4 are shown here, but may be of a conventional design.

Also, other motion sensing means are possible.

[0043] The tactile sensation device comprises an actuator 6 and a frame 7 shown in cross section. As is shown in figs. 2 and 3, the frame 7 is at one end connected to the actuator 6. The other end is designed for contacting the ball 4. The frame works as a lever with a support point 9 between the actuator end and the ball end. The frame 7 is acting as a link mechanism transferring movement of the actuator 6 at one end to a reciprocating movement at the other end of the frame. As the actuator moves downward the frame 7 will move upward impacting the ball 4, thus producing an impulse wave travelling through the ball. Preferably, the frame is only in physical contact with the ball 4 when the actuator 6 is working, so that no frictional drag is experienced by the user when moving the ball. Preferably, the frame has a circular contact surface 8 for striking the ball 4. The magnetic rolls 5 are accommodated inside the frame 7.

[0044] The frame should be made of a material having a larger weight, such as steel, in order to impact the ball forcibly and transforming the impulse from the link mechanism to the ball and through the ball to the user's finger. Even if the frame is made of steel it will not interfere with the function of the magnetic rolls 5, since the amplitude of the motion of the frame is very small and has a very short duration.

[0045] Different types of actuators are possible. The actuator suitably includes a linear motor capable of providing a force moving a member back and forth. One

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type consists of a piezoelectric material. This gives a length change when an electrical field is applied over its poles. This can be used to achieve a force or a movement. The actuator can consist of one or several stacked plates of piezoelectric ceramic. Different types for this are possible, like the piston type or the bimorph type.

[0046] Another type of linear motor includes an electromagnetic solenoid.

[0047] The actuator 8 is electrically driven from an amplifier (not shown), controlled by the control means included in the mobile telephone. Since the feedback is electrically controlled, several different types of feedback are possible, for example, one or several clicks, e.g. single clicks, dual clicks, with different amplitudes as the cursor is moved into various positions in a menu. Suitably, a single click is commanded by the control device when the cursor is moved in position over an icon. By commanding the actuator 8 to move repeatedly up and down it is also possible to create a vibration feel in the ball. The vibration may be slow or quick depending on the situation. This may be exploited e.g. in games when the cursor is moved over a "forbidden" area.

[0048] It is possible to combine the click and vibration feel with sounds. In this case the conventional speaker system of the mobile telephone is controlled by the control device to generate click sounds in connection with the click feel and e.g. a buzzing sound in combination with the vibration feel.

[0049] The invention provides several advantages over the prior art. The user will get a tactile feedback, i.e. a physical movement, in his finger when moving the cursor on the display. This will make it much easier to move the cursor on the display, like scrolling in a menu, when the user can feel the click in his finger for each new step. The possibility of using several different types of feedback, like vibrations, is extra useful for games. The device is almost contact-free, which will give a minimum of mechanical wear and resistance.

[0050] Although one embodiment of the invention is described in detail, it should be appreciated by a person skilled in the art that many variations are possible. E.g. the specific design of the link mechanism may be varied without departing from the scope of the invention as defined in the claims. The invention may be applied in all kinds of devices having a menu with a pointing device and is especially useful in portable devices, like portable radio communication equipment, such as mobile radio terminals, mobile telephones, pagers, communicators, electronic organisers and smartphones.

#### Claims

1. A method of providing tactile feedback in a portable device (1) comprising a display (2) for showing images including a movable cursor, and a pointing device (3, 4), the pointing device being used for inputting signals to a control device guiding the cursor

on the display (2), characterised in that a tactile sensation is generated when the cursor is moved to a defined position on the display (2).

2. A method according to claim 1, characterised in that a click feel is generated.
3. A method according to claim 2, characterised in that different click feels are generated when the cursor is moved to different defined positions on the display (2).
4. A method according to claim 3, characterised in that said different click feels include single clicks, dual clicks, and clicks with different amplitudes.
5. A method according to any one of claims 1 to 4, characterised in that a vibration feel is generated when the cursor is moved over a defined area on the display (2).
6. A method according to claim 5, characterised in that different vibration feels are generated when the cursor is moved over different defined areas on the display (2).
7. A method according to claim 6, characterised in that said different vibration feels include slow and quick vibrations.
8. A method according to any one of claims 1 to 7, characterised in that a click sound is generated simultaneously with the click feel.
9. A method according to claim 8, characterised in that a buzzing sound is generated simultaneously with the vibration feel.
10. A device for providing a tactile sensation in connection with a pointing device (3, 4), the pointing device being used for inputting signals to a control device guiding a cursor on a display (2), characterised in that the tactile sensation device comprises an actuator (8) adapted to be controlled by the control device and connected to a link mechanism (7) capable of impacting the pointing device (3, 4).
11. A tactile sensation device according to claim 10, characterised in that the link mechanism (7) is spaced from the pointing device (3, 4) when not impacting it.
12. A tactile sensation device according to claim 10 or 11, characterised in that the link mechanism (7) is adapted to hit the pointing device (3, 4) resulting in a click feel.
13. A tactile sensation device according to claim 12,

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characterised in that the link mechanism (7) is capable of hitting the pointing device (3, 4) in different ways, resulting in different click feels including single clicks, dual clicks, and clicks with different amplitudes.

14. A tactile sensation device according to claim 10, 11, 12 or 13, characterised in that the link mechanism (7) is adapted to hit the pointing device (3, 4) repeatedly resulting in a vibration feel.

15. A tactile sensation device according to claim 14, characterised in that the link mechanism (7) is capable of creating a vibration in the pointing device (3, 4) in different ways, resulting in different vibration feels including slow and quick vibrations.

16. A tactile sensation device according to any one of claims 10 to 15, characterised in that the link mechanism (7) comprises a lever, one end of which is movable by the actuator (8) and the other end of which is adapted to impact the pointing device (3, 4).

17. A tactile sensation device according to any one of claims 10 to 16, characterised in that the link mechanism (7) is provided with a substantially circular contact surface (8) for contacting a ball (4) of the pointing device (3).

18. A tactile sensation device according to claim 17, characterised in that the circular contact surface (8) is adapted to be located above magnetic rolls (5) of the pointing device (3).

19. A tactile sensation device according to any one of claims 10 to 18, characterised in that the link mechanism (7) is made of steel.

20. A tactile sensation device according to any one of claims 10 to 19, characterised in that the actuator (8) comprises a linear motor, a piezoelectric device or a solenoid.

21. A portable device (1) comprising a display (2) for showing images including a movable cursor, and a pointing device (3, 4), the pointing device being used for inputting signals to a control device guiding the cursor on the display (2), characterised by a device for providing a tactile sensation in connection with the pointing device (3, 4), wherein the tactile sensation device comprises an actuator (8) adapted to be controlled by the control device and connected to a link mechanism (7) capable of impacting the pointing device (3, 4).

22. A portable device according to claim 21, characterised in that the link mechanism (7) is spaced from

the pointing device (3, 4) when not impacting it.

23. A portable device according to claim 21 or 22, characterised in that the link mechanism (7) is adapted to hit the pointing device (3, 4) resulting in a click feel.

24. A portable device according to claim 23, characterised in that the link mechanism (7) is capable of hitting the pointing device (3, 4) in different ways, resulting in different click feels including single clicks, dual clicks, and clicks with different amplitudes.

25. A portable device according to claim 23 or 24, characterised in that the portable device (1) further comprises a sound generator adapted to generate a click sound simultaneous with the click feel.

26. A portable device according to any one of claims 23 to 25, characterised in that the control device is adapted to command a click feel, and possibly a click sound, when the cursor is moved to a defined position on the display (2).

27. A portable device according to any one of claims 21 to 26, characterised in that the link mechanism (7) is adapted to hit the pointing device (3, 4) repeatedly resulting in a vibration feel.

28. A portable device according to claim 27, characterised in that the link mechanism (7) is capable of creating a vibration in the pointing device (3, 4) in different ways, resulting in different vibration feels including slow and quick vibrations.

29. A portable device according to claim 25 and 27 or 28, characterised in that the sound generator further is adapted to generate a buzzing sound simultaneous with the vibration feel.

30. A portable device according to claim 27, 28, 29 or 30, characterised in that the control device is adapted to command a vibration feel, and possibly a buzzing sound, when the cursor is moved over a defined area on the display (2).

31. A portable device according to any one of claims 21 to 30, characterised in that the link mechanism (7) comprises a lever, one end of which is movable by the actuator (8) and the other end (8) of which is adapted to impact the pointing device (3, 4).

32. A portable device according to any one of claims 21 to 31, characterised in that the link mechanism (7) is provided with a substantially circular contact surface (8) for contacting a ball (4) of the pointing device (3).

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33. A portable device according to claim 32, characterised in that the circular contact surface (8) is adapted to be located above magnetic rolls (5) of the pointing device (3).

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34. A portable device according to any one of claims 21 to 33, characterised in that the link mechanism (7) is made of steel.

35. A portable device according to any one of claims 21 to 34, characterised in that the actuator (8) comprises a linear motor, a piezoelectric device or a solenoid.

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36. A portable device according to any one of claims 21 to 35, characterised in that the portable device (1) is a mobile radio terminal, e.g. a mobile telephone, a pager, a communicator, an electric organiser or a smartphone.

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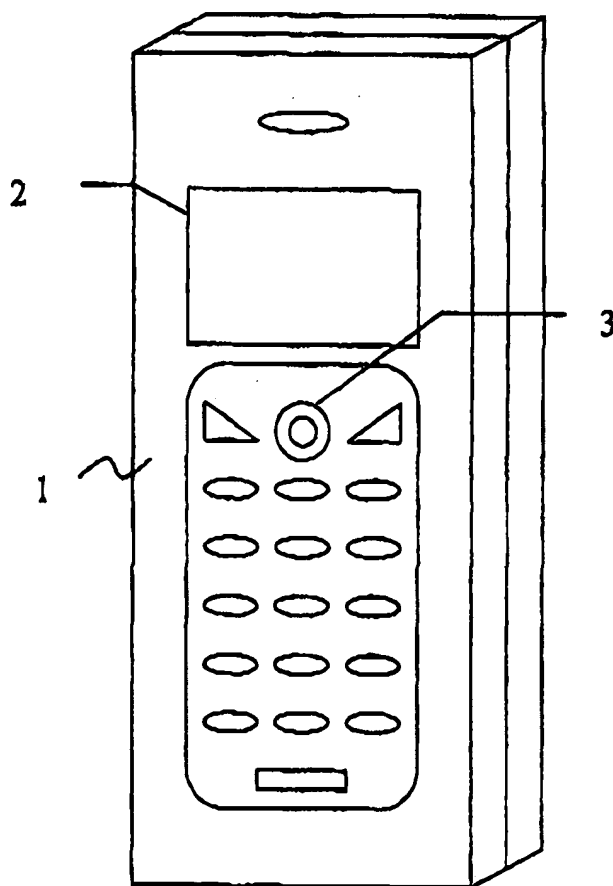


Fig. 1

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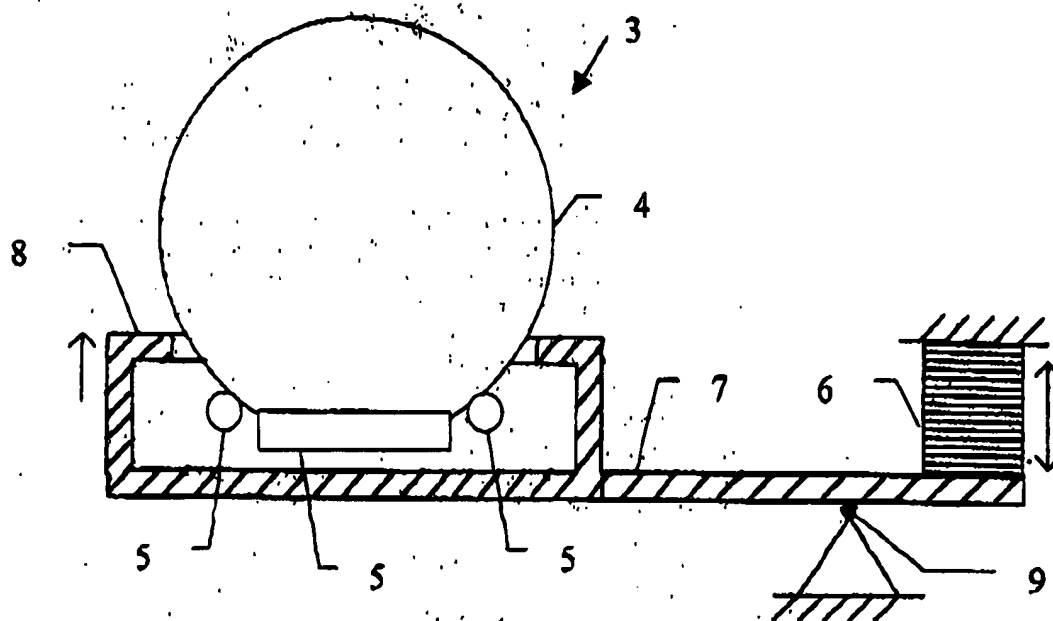


FIG 2

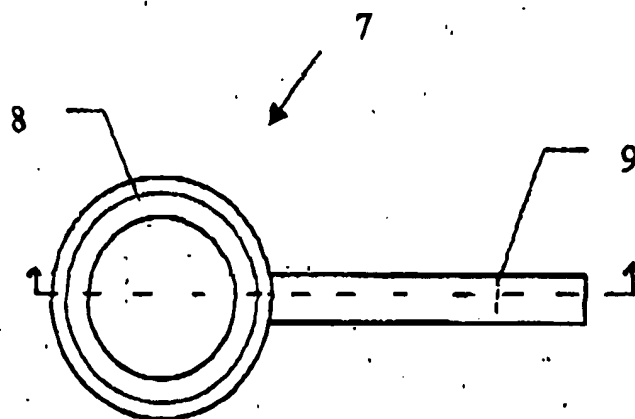


FIG 3



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**EUROPEAN SEARCH REPORT**

Application Number  
EP 02 07 7470

<b>DOCUMENTS CONSIDERED TO BE RELEVANT</b>			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 2001/035854 A1 (ROSENBERG LOUIS B ET AL) 1 November 2001 (2001-11-01)	1-7	G06K11/18 G06F3/00
Y	* paragraph '0007! - paragraph '0012! *	8, 9, 12-15, 20-36	
	* paragraphs '0043!, '0050!, '0051!, '0055! *		
X	DE 94 15 184 U (HEDICKE VOLKMAR ;KORNBLUM KLAUS HERMANN (DE)) 5 January 1995 (1995-01-05)	10, 11, 16-19	
Y	* page 1, line 25 - page 2, line 19 *	12-15, 20-36	
	* figure 1 *		
Y	US 6 285 351 B1 (MALLETT JEFFREY R ET AL) 4 September 2001 (2001-09-04)	8, 9	
	* column 2, line 35 - column 3, line 22 *		
A	DE 199 26 597 A (BOSCH GMBH ROBERT) 14 December 2000 (2000-12-14)	1-36	
	* the whole document *		
A	US 2002/054011 A1 (BRUNEAU RYAN D. ET AL) 9 May 2002 (2002-05-09)	1-36	
	* the whole document *		
A	US 5 784 052 A (KEYSON DAVID V) 21 July 1998 (1998-07-21)	1-36	
	* the whole document *		
A	EP 1 073 004 A (NOKIA MOBILE PHONES LTD) 31 January 2001 (2001-01-31)	36	
	* the whole document *		
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>17 January 2003</b>	Examiner <b>Rydman, J</b>
<b>CATEGORY OF CITED DOCUMENTS</b> X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons &: member of the same patent family, corresponding document			

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**17-01-2003**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2001035854 A1	01-11-2001	US 6184868 B1	06-02-2001
		US 6088019 A	11-07-2000
		US 6243078 B1	05-06-2001
		AU 2954301 A	31-07-2001
		WO 0154109 A1	26-07-2001
		US 2002033795 A1	21-03-2002
		AU 2342400 A	26-04-2000
		AU 4707499 A	10-01-2000
		CA 2300899 A1	29-12-1999
		DE 29923332 U1	07-12-2000
		DE 29923933 U1	05-07-2001
		EP 1005690 A1	07-06-2000
		GB 2343499 A , B	10-05-2000
		WO 9966997 A1	29-12-1999
		WO 0021071 A2	13-04-2000
		US 2002054011 A1	09-05-2002
		US 2001000663 A1	03-05-2001
		US 2001019324 A1	06-09-2001
		US 2002097223 A1	25-07-2002
		US 6211861 B1	03-04-2001
		US 6448977 B1	10-09-2002
		US 6353427 B1	05-03-2002
		US 2001026264 A1	04-10-2001
		US 2001010513 A1	02-08-2001
		DE 29922298 U1	02-03-2000
		GB 2346952 A	23-08-2000
DE 9415184 U	05-01-1995	DE 9415184 U1	05-01-1995
US 6285351 B1	04-09-2001	US 6147674 A	14-11-2000
		US 6169540 B1	02-01-2001
		DE 10004372 A1	14-09-2000
		FR 2790319 A1	01-09-2000
		GB 2346455 A	09-08-2000
		IT V120000024 A1	01-08-2001
		US 6292170 B1	18-09-2001
		US 2002163498 A1	07-11-2002
		EP 1012697 A1	28-06-2000
		WO 9849614 A1	05-11-1998
		US 2002054021 A1	09-05-2002
		EP 0995152 A1	26-04-2000
		WO 9858308 A1	23-12-1998
DE 19926597 A	14-12-2000	DE 19926597 A1	14-12-2000
		WO 0077721 A1	21-12-2000
		EP 1192586 A1	03-04-2002

EPO FORM P0432

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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**17-01-2003**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002054011 A1	09-05-2002	US 6088019 A	11-07-2000
		US 6243078 B1	05-06-2001
		US 6184868 B1	06-02-2001
		DE 20102767 U1	21-06-2001
		AU 4707499 A	10-01-2000
		CA 2300899 A1	29-12-1999
		DE 29923332 U1	07-12-2000
		EP 1005690 A1	07-06-2000
		GB 2343499 A , 8	10-05-2000
		US 2002097223 A1	25-07-2002
		WO 9966997 A1	29-12-1999
		US 6211861 B1	03-04-2001
		US 2001035854 A1	01-11-2001
		US 6448977 B1	10-09-2002
		US 6353427 B1	05-03-2002
		US 2001026264 A1	04-10-2001
		US 2001010513 A1	02-08-2001
		US 2001019324 A1	06-09-2001
		DE 29922298 U1	02-03-2000
		GB 2346952 A	23-08-2000
		AU 2342400 A	26-04-2000
		DE 29923933 U1	05-07-2001
		WO 0021071 A2	13-04-2000
		US 2001000663 A1	03-05-2001
US 5784052 A	21-07-1998	DE 69622101 D1	08-08-2002
		EP 0760118 A1	05-03-1997
		WO 9628777 A1	19-09-1996
		JP 10500516 T	13-01-1998
EP 1073004 A	31-01-2001	US 6480185 B1	12-11-2002
		EP 1073004 A2	31-01-2001

EPO FORM P0459

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